Compounding Riddles using the training course material

2007

Compounding riddles using the training course material

Probably each of us wondered at least once why it is not easy to find necessary information in Internet. If the World Wide Web contains practically everything, then why what we need is sometimes so difficult to find?

The head of the modern man is similar to Internet in some ways: it also stores a great amount of information, but finding a needed piece of information in the fullness of time is sometimes very difficult. The ability to organize information in such a way that it is convenient to use is one of the most valued skills.

This material will help a teacher teach and a pupil learn independently to structure information.

Let us agree that…

Let us agree that everything we can obtain information about be called ELEMENTS OF THE WORLD or OBJECTS – you may choose what is more convenient for your.

We obtain information about objects by asking questions. For information to be convenient to use, questions are often presented in the form of short denominative sentences. For example, the question "What color is it?" is denoted with the word "Color" and the word "Function" stands for the entire question "What is this object designed for?". If you had to deal with table-like presentation of information, you will easily recognize "ciphered" questions in the table headings.

For example, in studying natural zones, we ask the following questions:
In which part of the world is a natural zone situated?
What are climatic conditions like?
What animals and plants are typical for this zone?

and the like.

Information may be presented in the form of a table:

Natural zone name	
Location	
Climatic conditions	
Animal world	
Vegetable world	

Let us give the characteristics of the object "natural zone", given in the left column, the names of properties. They may be presented in the form of questions. Let us

call possible meanings of these characteristics (answers to the questions) the property values. A specific value or many values will correspond to each natural zone presented in the left column. For example, the vegetable world of the Arctic includes mosses, lichens, dwarf arctic birch…, the vegetable world of prairie is characterized by graminaceous plants, bushes, etc.

To study some object, it is very important to have a scheme for describing this object. However, depending on our goals, one and the same object can be described through different names of properties.

Let us consider the object "**brick**"

What questions will a mathematician ask about a brick? (What is its shape, length, width, height, area, volume?)

What questions will a physicist ask? (What is its density, weight? Is it electrically conducting? Is it water-permeable? How hard is it?)

What questions will a biologist ask? (Are there living organisms inside it or on its surface? Can it serve as a habitat for microorganisms or fungi and what resources are available (moisture content, temperature, etc.)?

The "construction set" we offer teaches speaking in terms of objects' properties.

Let us start from the result

Using this "construction set", you can compose the following types of tasks:

1. Compound a riddle about a linear function according to the following scheme:
   Degree of the unknown?
   Ratio of the left part and the right part?
   Constituent elements?

2. You will ask, "Function?". I will answer, "To pump liquid". You will ask, "Operation time?" I will answer, "70 to 100 years". You will ask, "Number of chambers? I will answer, "4". What is that?

3. I was asked three questions about a car engine. To the first question, I answered, "To convert energy into mechanical energy". The answer to the second question was "Gasoline"; and to the third question I answered, "From … to … %". What question was I asked?

All these tasks were made up using the above "construction set".

Element	Property name	Property value
!	!	?
?	!	!
!	?	!

The exclamation mark denotes the asked part, the interrogation mark denotes the hidden part.

To compose this type of tasks, it is necessary:

1)   to select an element of the world and describe it using the ENV model. If a generalized element (for example, not a specific equation, but any linear equation) is selected, it should be described through constant properties having one value;

2)   to use schemes given in the table. Instead of the exclamation mark, we insert specific information, while the interrogation mark specifies the question content.

Let us consider the examples in detail.

Examples of tasks in mathematics

Describing an element according to the "element – property names – property values" model

Element of the world	Property name	Property value
Linear equation	Degree of the unknown	First
	Ratio of parts	Equal
	Composition (components)	Numbers and expressions

Task type

Element of the world	Property name	Property value
?	**!**	**!**
	Degree of the unknown	First
	Ratio of parts	Equal
	Composition (components)	Numbers and expressions

Task text

You will ask, "Degree of the unknown?" – I will answer, "First"
You will ask, "Ratio of parts?" – I will answer, "Equal"
You will ask, "Composed of?" – I will answer, "Of numbers and expressions"
What is it?

The task performance result: answer: "linear equation"

****

Task type

Element of the world	Property name	Property value
!	!	?
Linear equation	Degree of the unknown	?
	Ration of parts	?

	Composition (components)	?

Task test

Compound a riddle about a linear equation using the following scheme:
1) Degree of the unknown
2) Ratio of parts
3) Composition (components)

Result: "The unknown of the first degree, composed of equal parts represented by numbers and expressions. What is it?"

****

Task type

Element of the world	Property name	Property value
!	?	!
Linear equation	?	First
	?	Equal
	?	Numbers and expressions

Task text

I was asked questions about a linear equation. To the first question, I asked, "First", the answer to the second question was "equal", and "numbers and expressions" was the answer to the third question. Guess the questions.

Performance result

1st question: «Degree?»
2nd question: «Ratio of the first part and second part?»
3rd part: «Components?»

Example of task in biology

Describing an element according to the "element – property names – property values" model

Element of the world	Property name	Property value
Human heart	Function	Pumping liquid
	Mean operation time	70 to 100 years
	Number of chambers	4

Task type

Element of the world	Property name	Property value
?	!	!

	Function	Pumping liquid
	Mean operation time	70 to 100 years
	Number of chambers	4

Task text

You will ask, «Function?» I will answer «To pump liquid»
You will ask, "Operation time?" I will answer, "70 to 100 years.
You will ask, "Number of chambers?" I will answer: 4
What is it?

Result: «Human heart»

****

Task type

Element of the world	Property name	Property value
!	!	?
Human heart	Function	
	Mean operation time	
	Number of chambers	

Task text

Compound a riddle about a human heart according to the following scheme:
1. Function
2. Mean operation time
3. Number chambers

Task performance result

Its work is to pump liquid, it serves 70 to 100 years, it has 4 chambers. What is it?

****

Task type

World element	Property name	Property value
!	?	!
Human heart		Pumping liquid
		70 to 100 years
		4

Task text

"I was asked questions about a human heart. My answer to the first question was: to pump liquid.
To the second question, I answered, "70 to 100 years on the average"
The third answer was: 4
What questions was I asked?

Result:

1st question – Function?
2nd question – Mean lifetime?
3rd question – Number of chambers?

The above-mentioned examples include a task relating to a car engine based on the following model:

World element	Property name	Property value
Car engine	Function	Conversion of chemical energy into mechanical energy
	Fuel	Gasoline
	Efficiency	On the average ...

According to what scheme is the task composed? What other tasks can be composed using this model?